CLAIMS

1. A process for producing linear alkyl benzene and linear paraffins, the process including the steps of obtaining a hydrocarbon condensate containing olefins, paraffins and oxygenates from a low temperature Fischer-Tropsch reaction;

    a) fractionating a desired carbon number distribution from the hydrocarbon condensate to form a fractionated hydrocarbon condensate stream;
    b) extracting oxygenates from the fractionated hydrocarbon condensate stream from step a) to form a stream containing olefins and paraffins;
    c) alkylating the stream containing olefins and paraffins from step b) with benzene in the presence of a suitable alkylation catalyst; and
    d) recovering linear alkyl benzene and linear paraffin.

2. The process according to claim 1, wherein the low temperature Fischer-Tropsch reaction is carried out at a temperature of 160°C - 280°C to provide a hydrocarbon condensate containing 60 to 80% by weight paraffins and 10 to 30% by weight olefins.

3. The process according to claim 2, wherein the Fischer-Tropsch reaction is carried out at a temperature of 210°C - 260°C.

4. The process according to any one of claims 1 – 3, wherein the Fischer-Tropsch reaction is carried out in the presence of a cobalt catalyst.

5. The process according to any one of claims 2 – 4, wherein the hydrocarbon condensate contains less than 25% by weight olefins.

6. The process according to any one of claims 2 – 5, wherein the olefins in the hydrocarbon condensate have a degree of linearity of greater than 95%.

7. The process according to any one of claims 2 – 6, wherein the paraffins in the hydrocarbon condensate have a degree of linearity of greater than 92%.

8. The process according to any one of claims 1 – 7, wherein the hydrocarbon condensate is fractionated, in step a), into the C_8 to C_{16} range.

9. The process according to claim 8, wherein the hydrocarbon condensate product is fractionated, in step a), into the C_{10} to C_{13} range.

10. The process according to claim 9, wherein the fractionated hydrocarbon product contains 10 to 30% by weight olefins with a degree of linearity greater than 92%.

11. The process according to any one of claims 1 – 10, wherein the oxygenates are extracted, in step b), by distillation, liquid-liquid extraction or dehydration.

12. The process according to claim 11, wherein the oxygenates are extracted by liquid-liquid extraction.

13. The process according to claim 12, wherein a light solvent is used in the liquid-liquid extraction.

14. The process according claim 13, wherein the light solvent is a mixture of methanol and water.

15. The process according to claim 14, wherein the oxygenate extraction process is a liquid-liquid extraction process that takes place in an extraction column using a mixture of methanol and water as the solvent, wherein an extract from the liquid-liquid extraction is sent to a solvent recovery column from which a tops product comprising methanol, olefins and paraffins is recycled to the extraction column, thereby enhancing the overall recovery of olefins and paraffins.

16. The process according to claim 15, wherein a bottoms product from the solvent recovery column is recycled to the extraction column.

17. The process according to any one of claims 14 – 16, wherein the solvent has a water content of more than 3% by weight.

18. The process according to claim 17, wherein the solvent has a water content of from 5% - 15% by weight.

19. The process according to any one of claims 15 – 17, wherein a raffinate from the extraction column is sent to a stripper column from which a hydrocarbon stream containing more than 90% by weight olefins and paraffins and less than 0.2% by weight oxygenates exits as a bottoms product.

20. The process according to claim 19, wherein the bottoms product contains less than 0.02% by weight oxygenates.

21. The process according to any one of the preceding claims, wherein the recovery of olefins and paraffins in the hydrocarbon feed stream over the extraction step b) is in excess of 70%.

22. The process according to claim 21, wherein the recovery of olefins and paraffins is in excess of 80%.

23. The process according to any one of the preceding claims, wherein the olefin/paraffin ratio of the fractionated hydrocarbon condensate stream a) is substantially preserved over the extraction step b).

24. The process according to any one of the preceding claims wherein the alkylation catalyst in step c) is a solid acid catalyst.

25. A fractionated hydrocarbon condensate product from a Fischer-Tropsch reaction, in the C_8 to C_{16} range, containing olefins with a degree of linearity of greater than 92%, for use in a process for manufacturing linear alkyl benzene.

26. The fractionated hydrocarbon condensate product according to claim 25 in the C_{10} to C_{13} range.

27. The fractionated hydrocarbon condensate according to claim 25 or claim 26, wherein the olefins have a degree of linearity of greater than 95%.

28. A linear alkyl benzene product formed by an alkylation process of olefins, said olefins being a product of a Fischer-Tropsch reaction, wherein the linear alkyl benzene product has a degree of linearity of greater than 90%.

29. The linear alkyl benzene product according to claim 28, having a degree of linearity of greater than 94%.